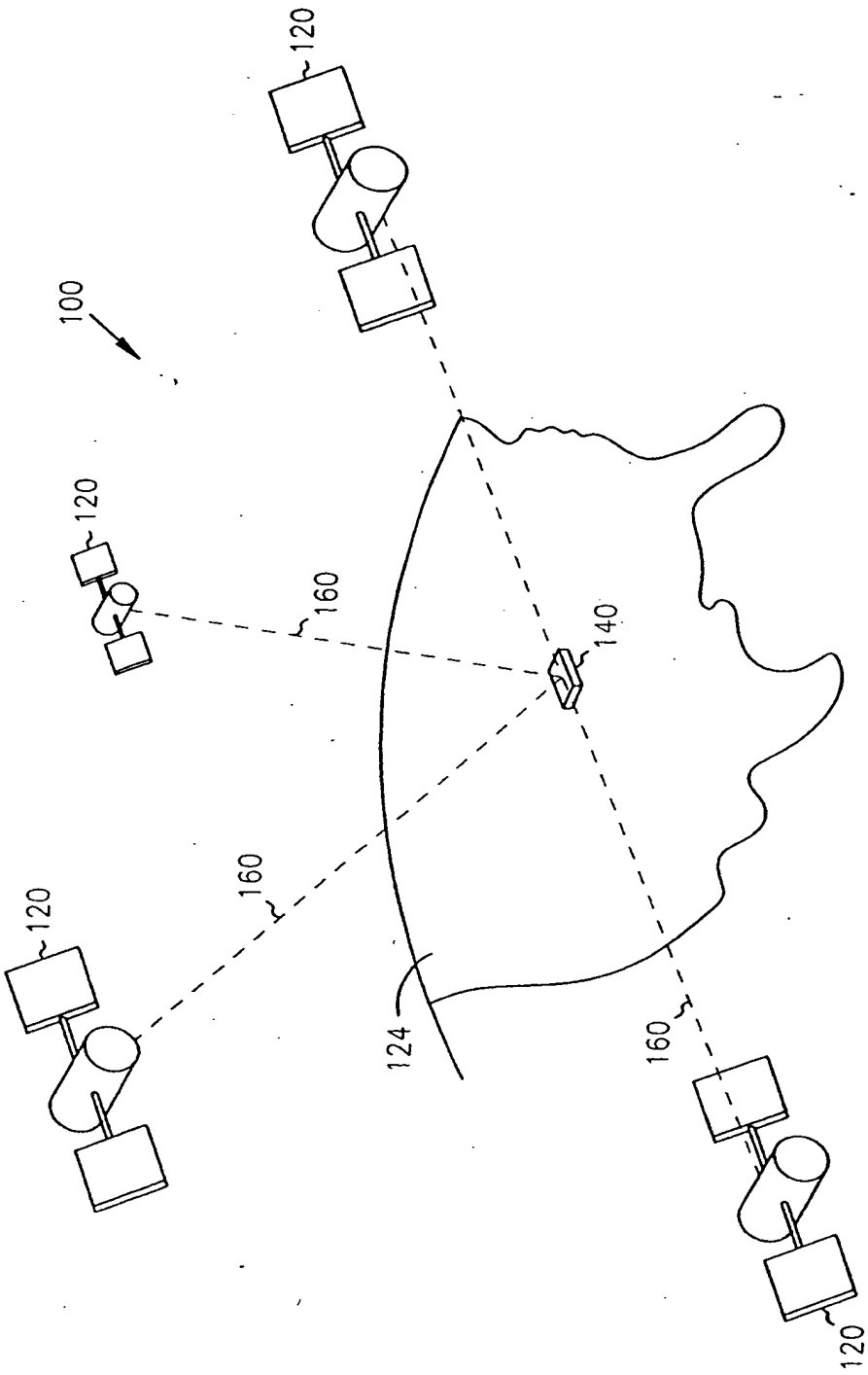


FIG. 1

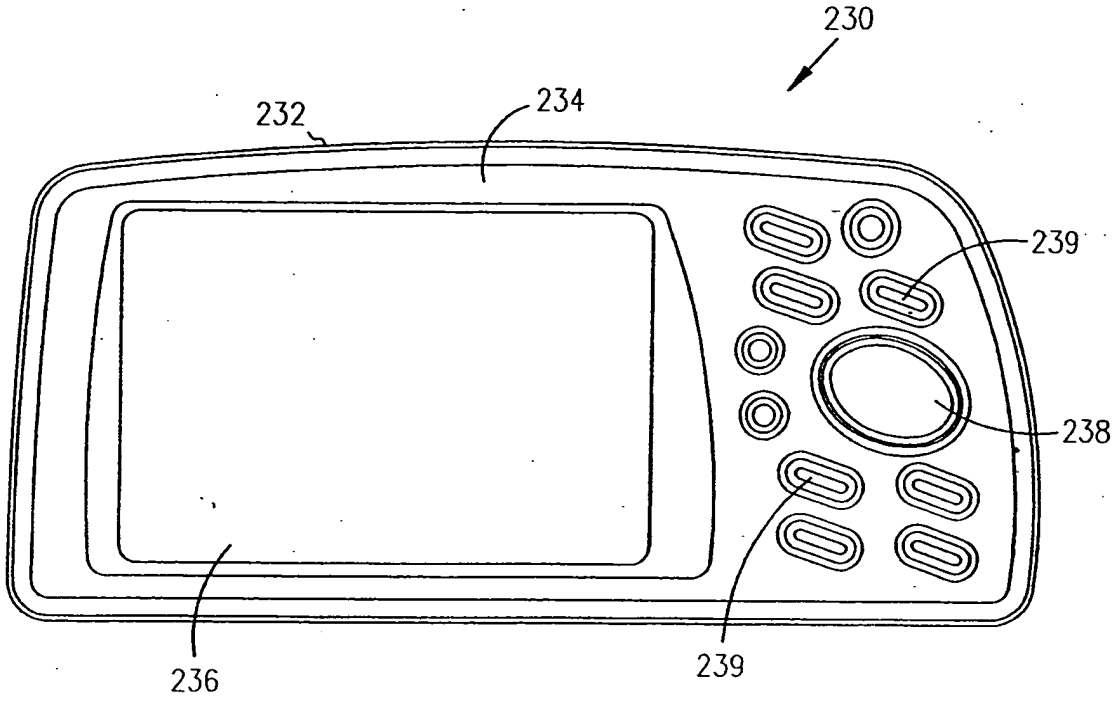


FIG. 2A

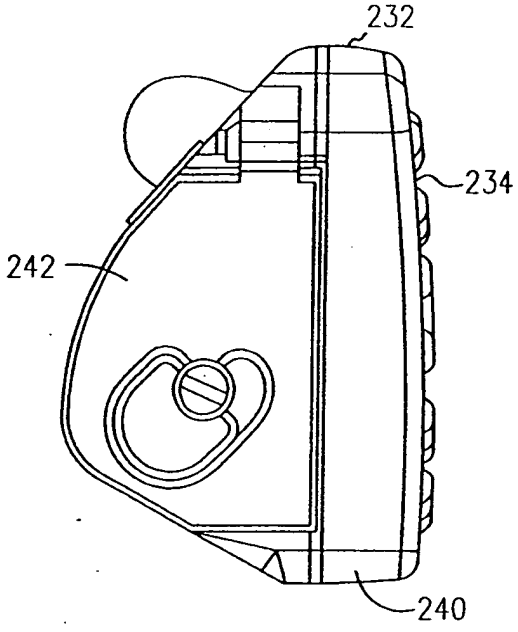


FIG. 2B

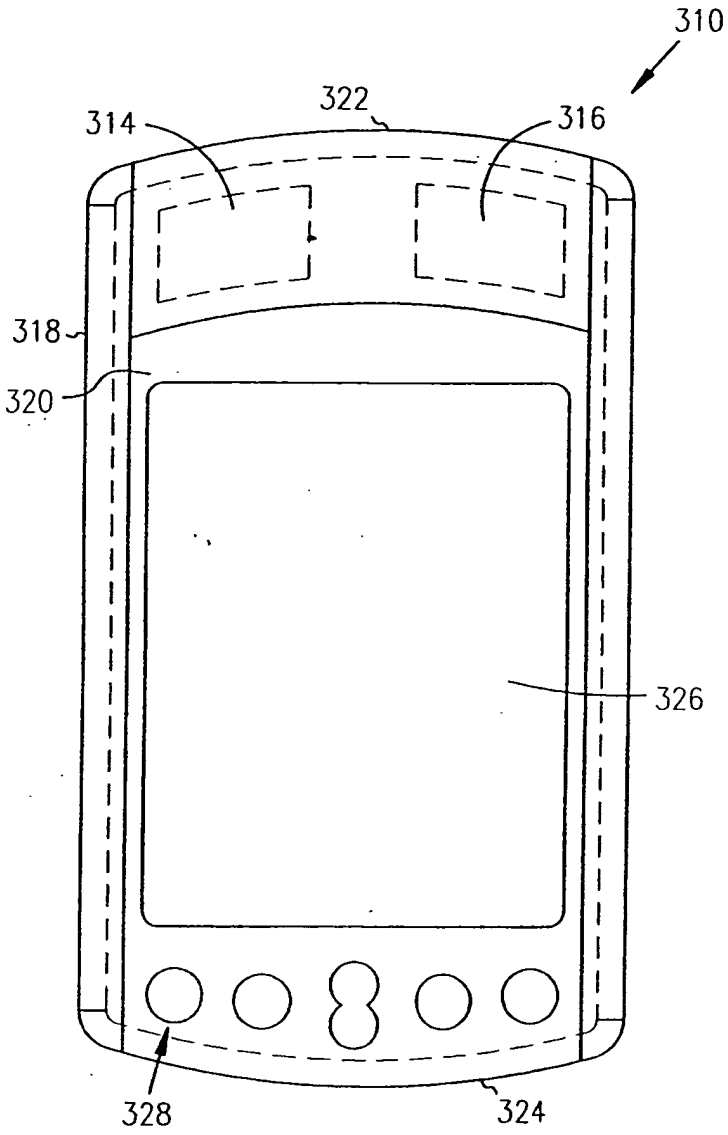


FIG. 3A

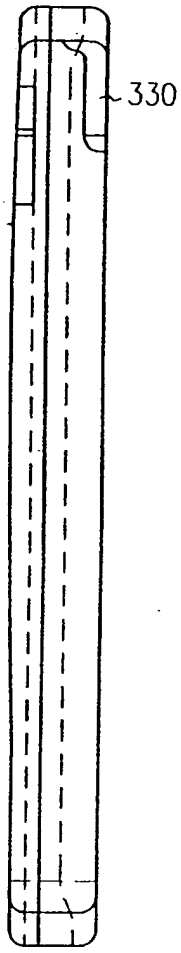


FIG. 3B

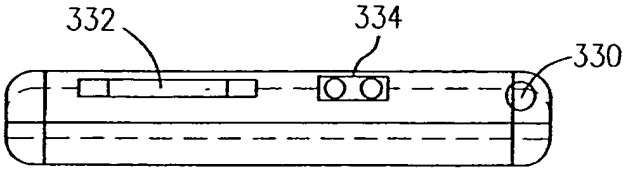


FIG. 3C

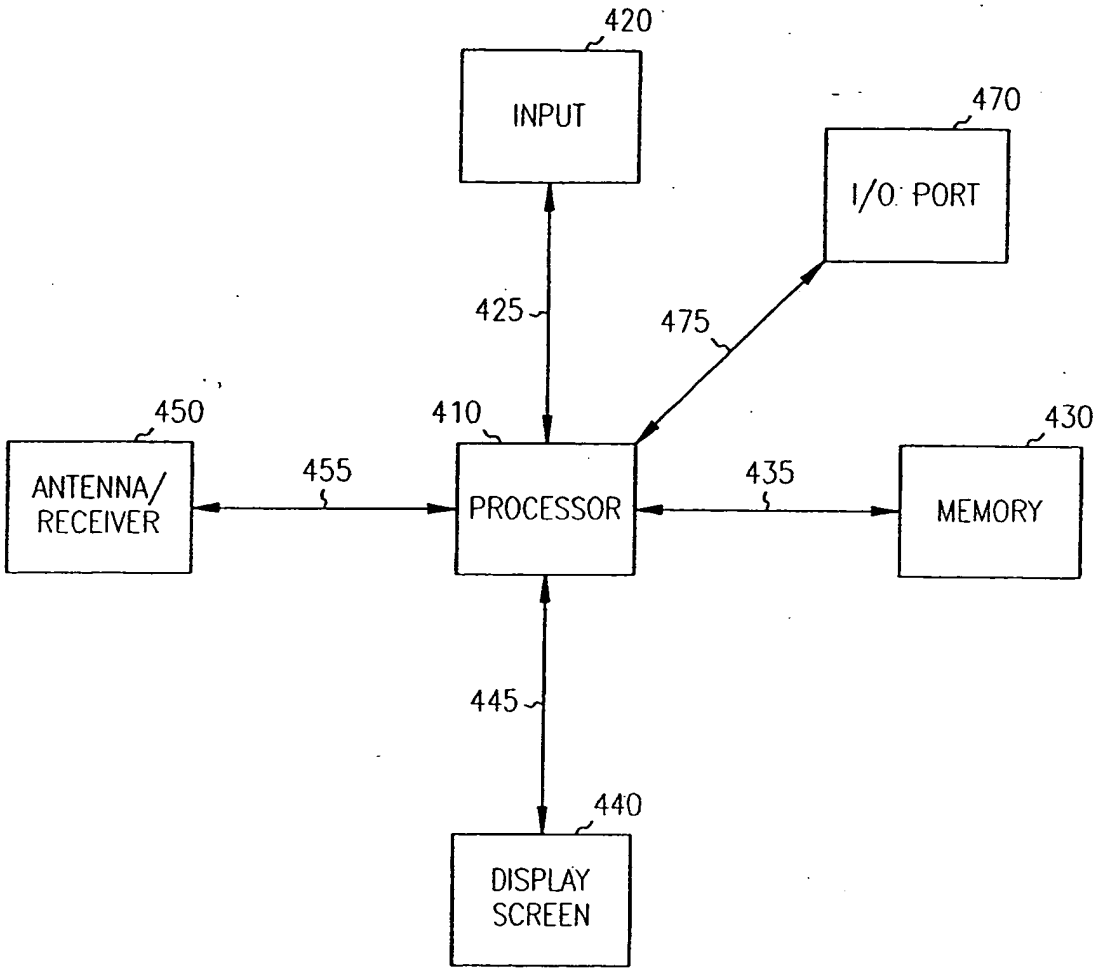

420
INPUT
470
I/O PORT
425
475
450
410
430
ANTENNA/
RECEIVER
455
PROCESSOR
435
MEMORY
445
440
DISPLAY
SCREEN

FIG. 4A

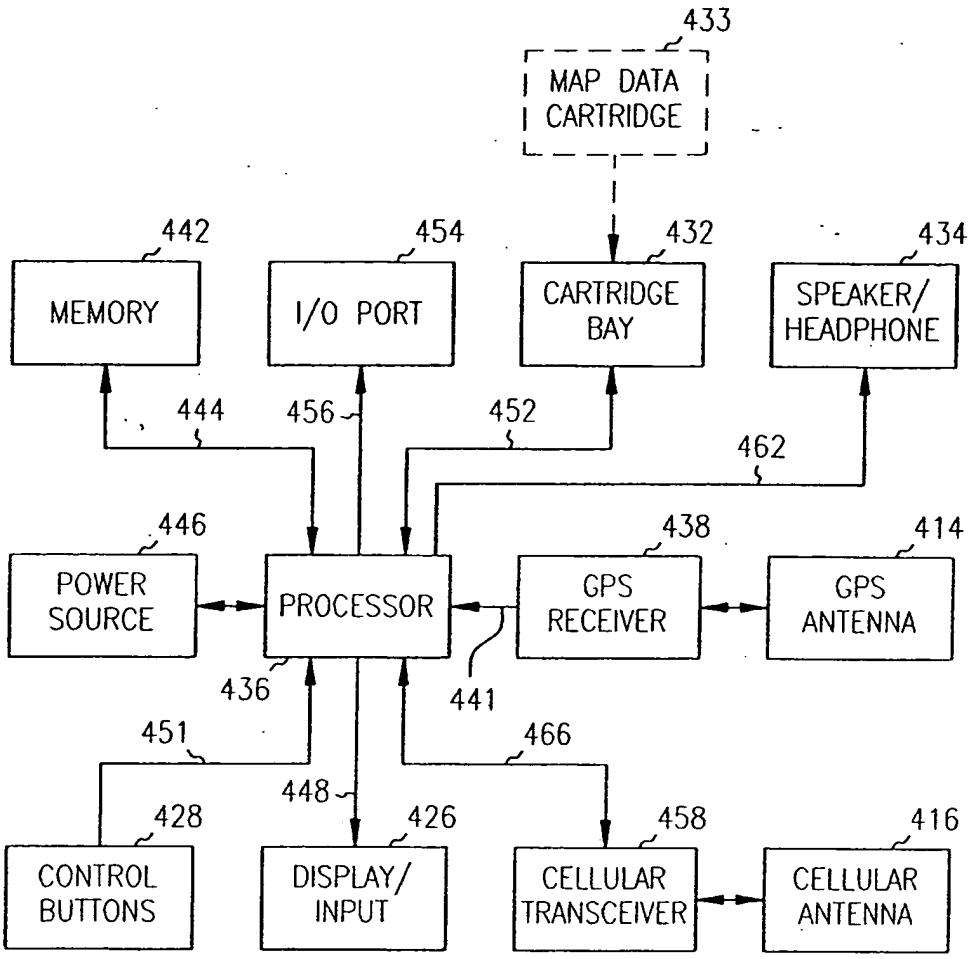

433
MAP DATA CARTRIDGE
442
MEMORY
454
I/O PORT
432
CARTRIDGE BAY
434
SPEAKER/ HEADPHONE
444
456
452
462
446
POWER SOURCE
PROCESSOR
438
GPS RECEIVER
414
GPS ANTENNA
436
441
451
466
448
428
CONTROL BUTTONS
426
DISPLAY/ INPUT
458
CELLULAR TRANSCEIVER
416
CELLULAR ANTENNA

FIG. 4B

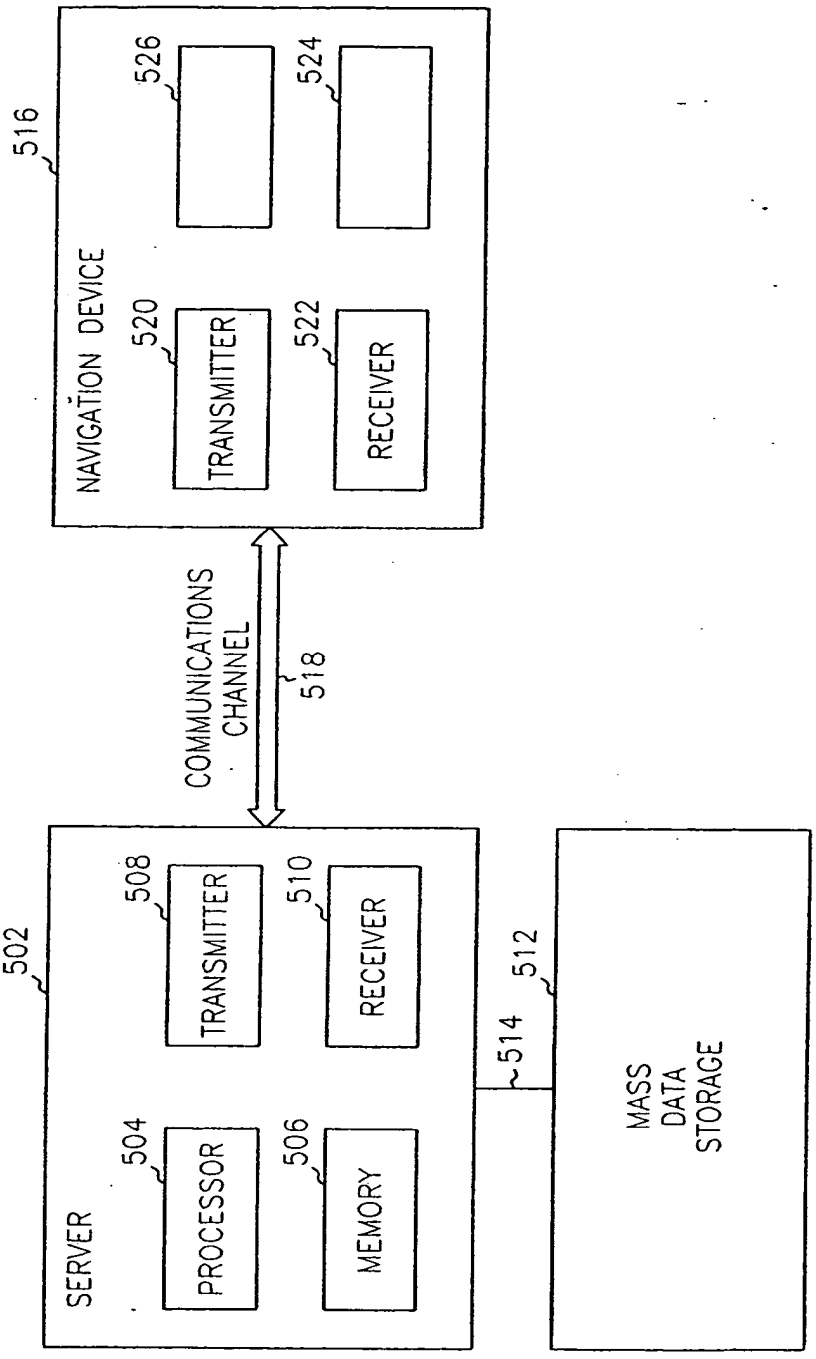

516
NAVIGATION DEVICE
526
524
520
TRANSMITTER
522
RECEIVER
COMMUNICATIONS CHANNEL
518
502
SERVER
508
TRANSMITTER
510
RECEIVER
504
PROCESSOR
506
MEMORY
514
512
MASS DATA STORAGE

FIG. 5

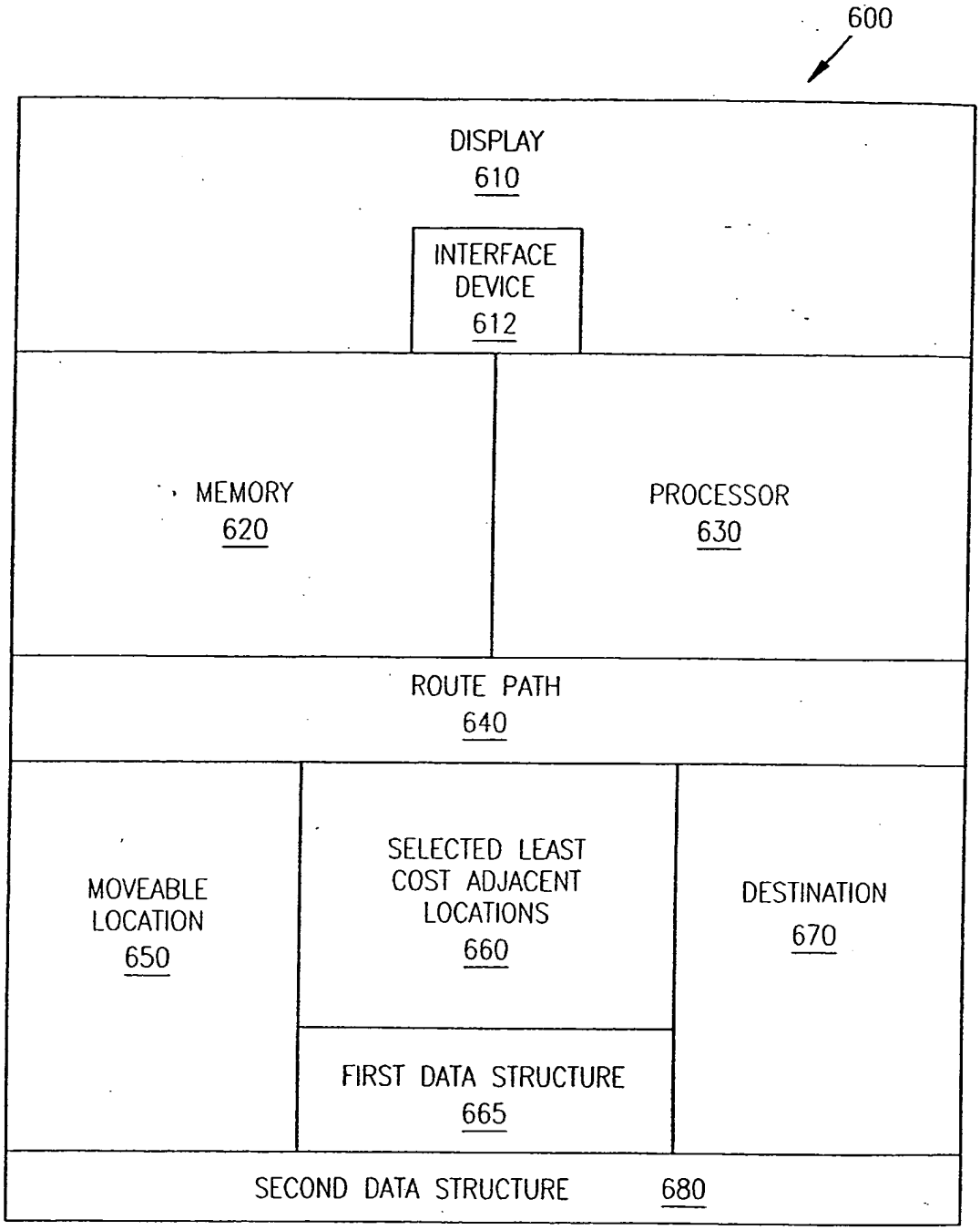
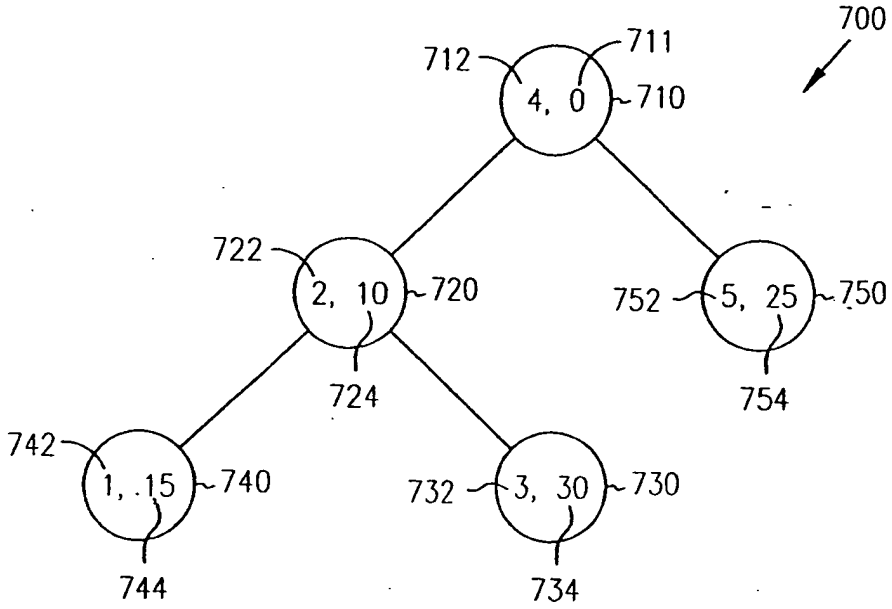
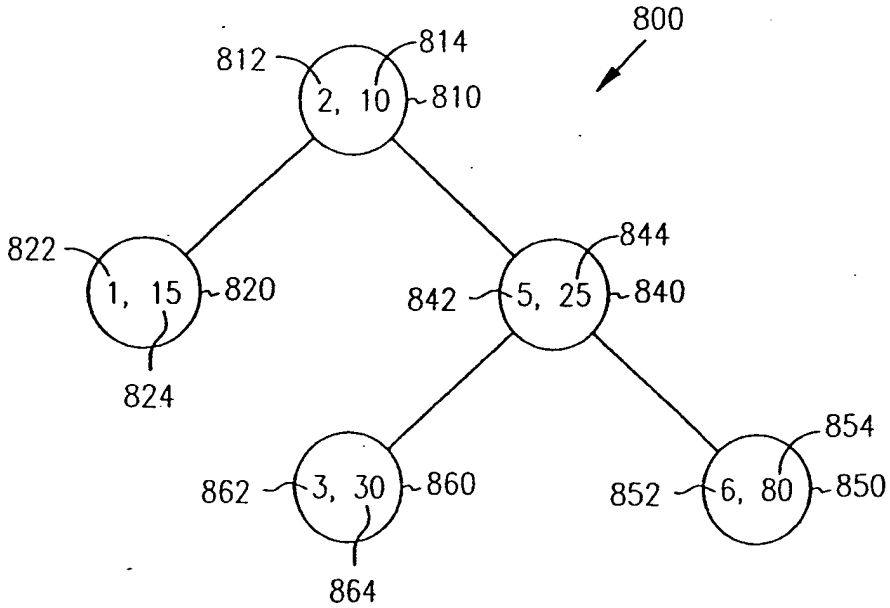

600
DISPLAY
610
INTERFACE
DEVICE
612
MEMORY
620
PROCESSOR
630
ROUTE PATH
640
MOVEABLE
LOCATION
650
SELECTED LEAST
COST ADJACENT
LOCATIONS
660
DESTINATION
670
FIRST DATA STRUCTURE
665
SECOND DATA STRUCTURE
680

FIG. 6



760 ~ T_2 = (1,15), (3), (2, 10), (4, 0), (5, 25)

FIG. 7



860 ~ DELETE (4, 0)

870 ~ INSERT (6, 80)

880 ~ T_1 = (1,15), (2, 10), (3), (5, 25), (6, 80)

FIG. 8

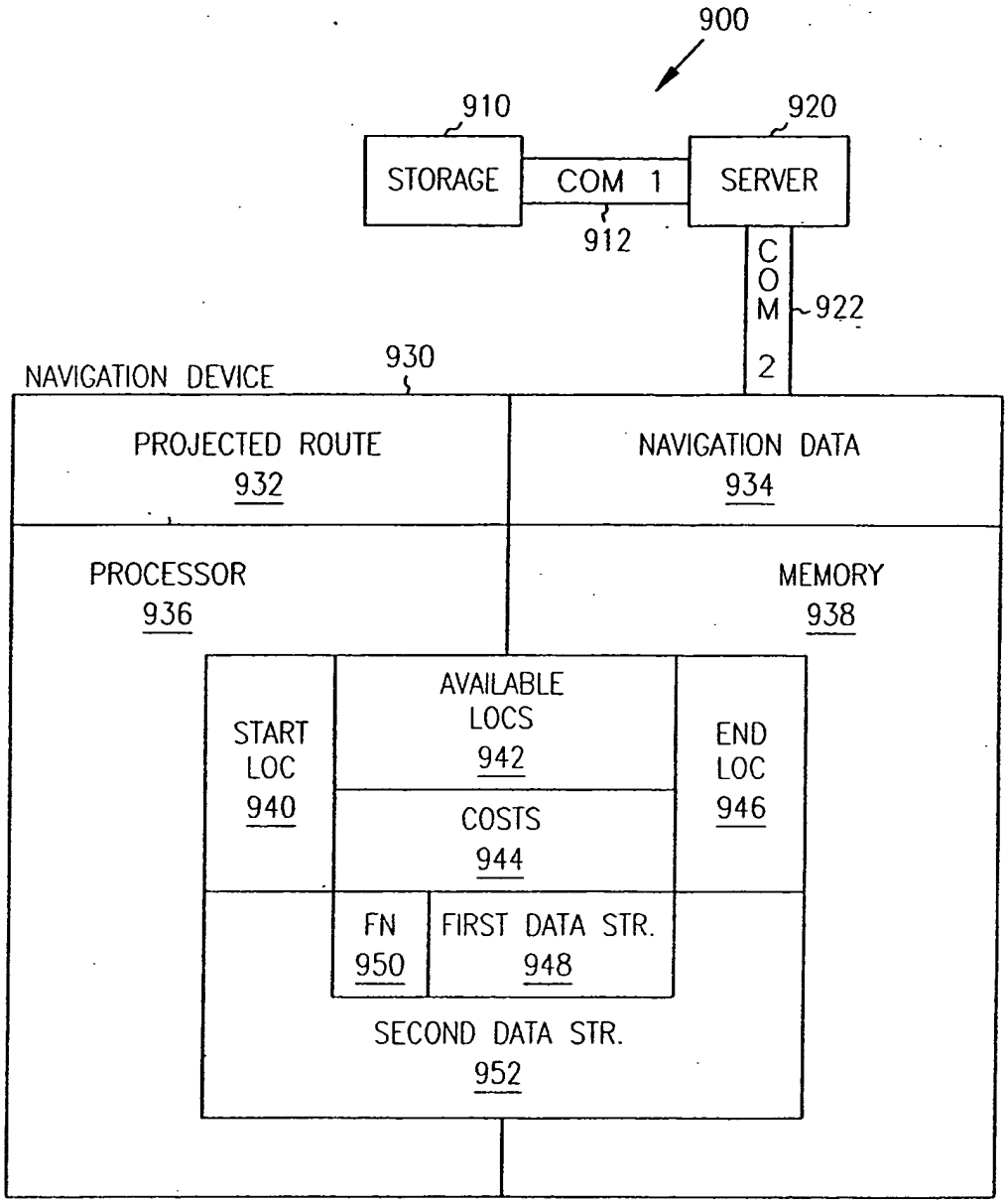

900
910
920
STORAGE
COM 1
SERVER
912
COM 2
922
NAVIGATION DEVICE
930
PROJECTED ROUTE
932
NAVIGATION DATA
934
PROCESSOR
936
MEMORY
938
START LOC
940
AVAILABLE LOCS
942
COSTS
944
END LOC
946
FN
950
FIRST DATA STR.
948
SECOND DATA STR.
952

FIG. 9

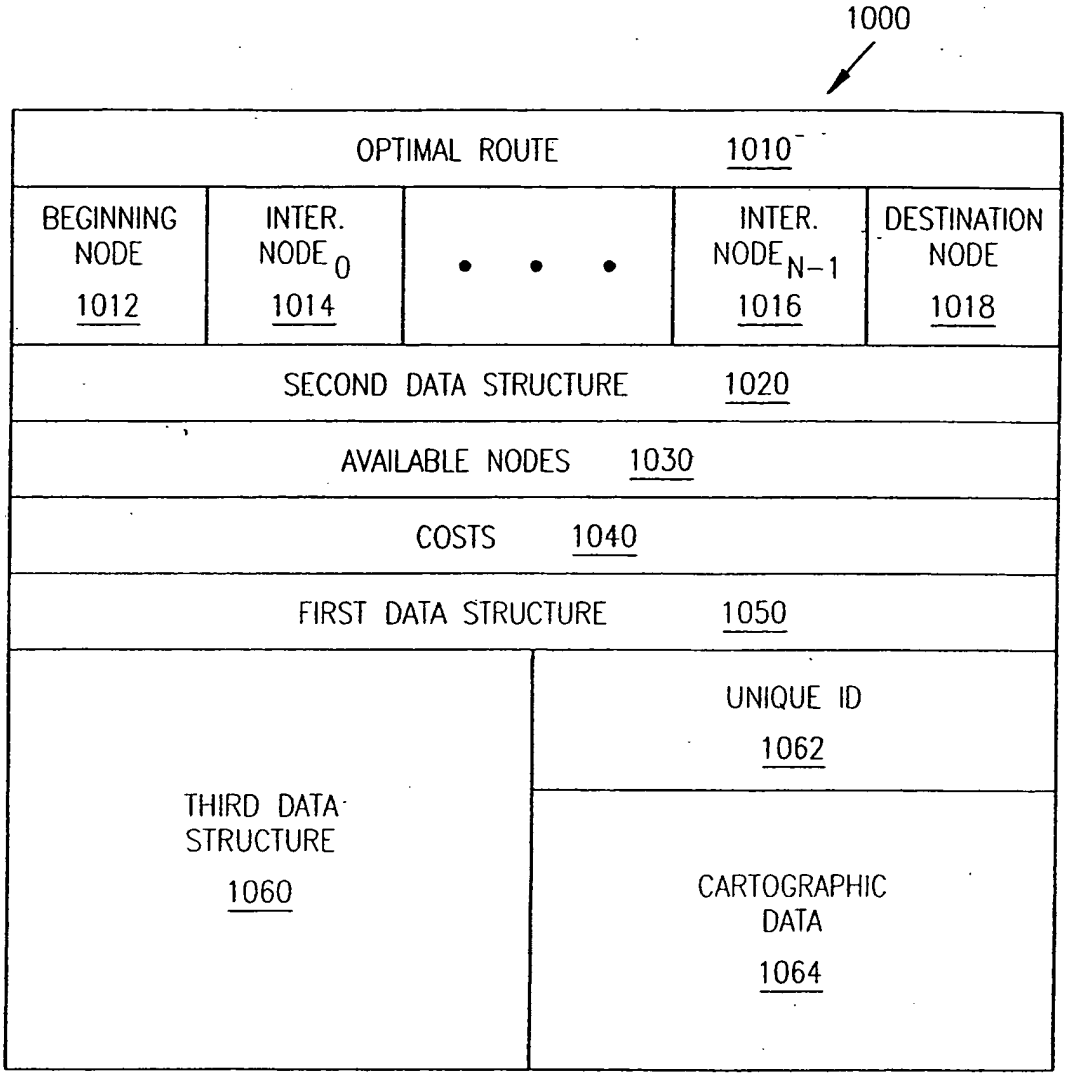

1000
OPTIMAL ROUTE 1010
BEGINNING NODE 1012
INTER. NODE 0 1014
• • •
INTER. NODE N-1 1016
DESTINATION NODE 1018
SECOND DATA STRUCTURE 1020
AVAILABLE NODES 1030
COSTS 1040
FIRST DATA STRUCTURE 1050
THIRD DATA STRUCTURE 1060
UNIQUE ID 1062
CARTOGRAPHIC DATA 1064

FIG. 10

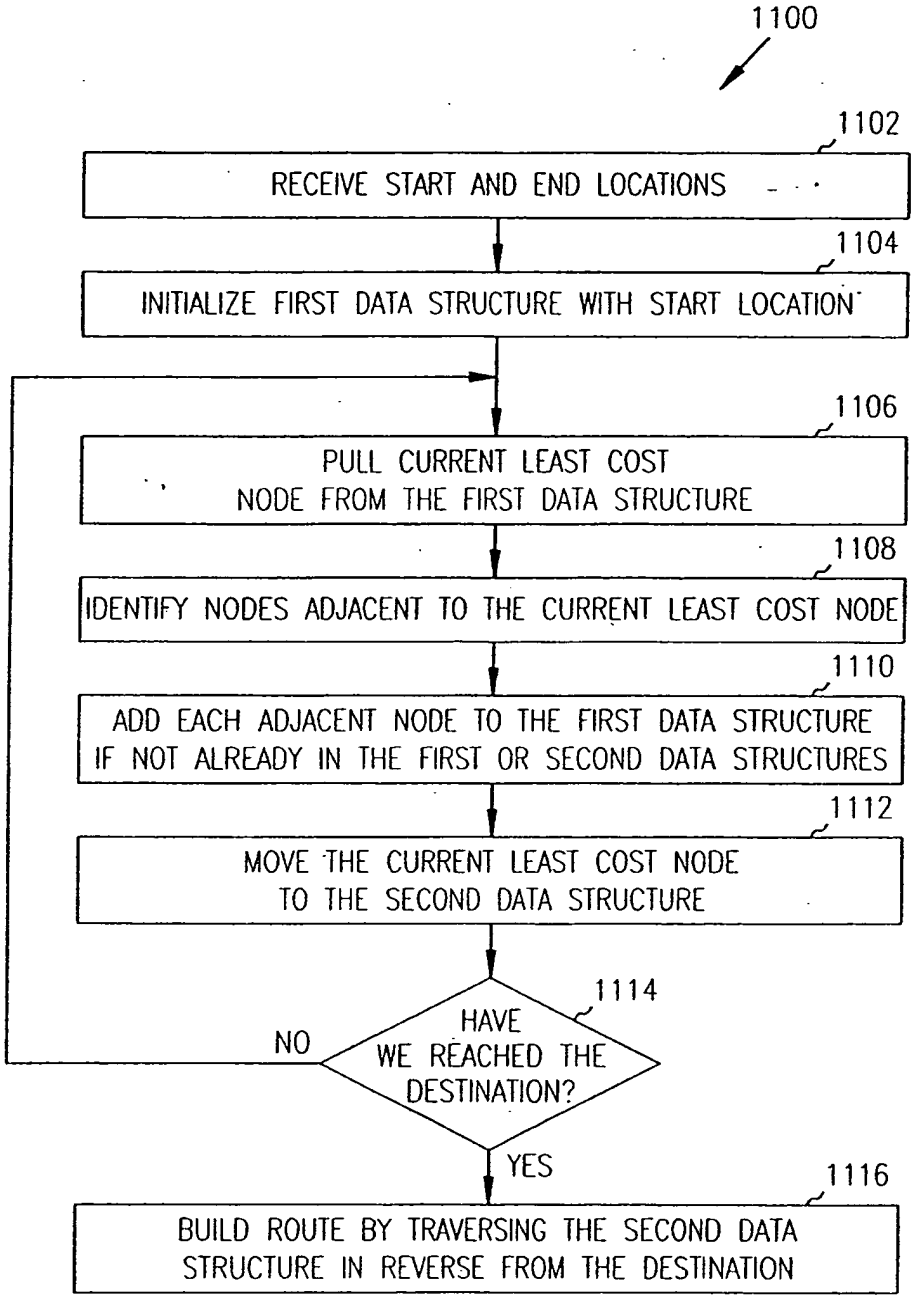

1100
1102
RECEIVE START AND END LOCATIONS
1104
INITIALIZE FIRST DATA STRUCTURE WITH START LOCATION
1106
PULL CURRENT LEAST COST NODE FROM THE FIRST DATA STRUCTURE
1108
IDENTIFY NODES ADJACENT TO THE CURRENT LEAST COST NODE
1110
ADD EACH ADJACENT NODE TO THE FIRST DATA STRUCTURE IF NOT ALREADY IN THE FIRST OR SECOND DATA STRUCTURES
1112
MOVE THE CURRENT LEAST COST NODE TO THE SECOND DATA STRUCTURE
1114
HAVE WE REACHED THE DESTINATION?
NO
YES
1116
BUILD ROUTE BY TRAVERSING THE SECOND DATA STRUCTURE IN REVERSE FROM THE DESTINATION

FIG. 11